

## **REMARKS**

### **I. The Rejections Under 35 U.S.C. §103**

#### **(i) claims 1-4, 6-8 and 19**

Claims 1-4, 6-8 and 19 were once again rejected under 35 U.S.C. §103(a) based on the combination of U.S. Pat. No. 4,344,477 to Miki et al (“Miki”) in view of U.S. Pat. No. 5,040,589 to Bradley et al (“Bradley”). Applicants respectfully disagree and traverse these rejections for at least the following reasons.

As the Applicants have stated previously, and now reiterate, neither Miki nor Bradley, taken separately or in combination, disclose the features of: (a) injecting a heated metal slurry into a formation that defines fins under a predetermined pressure to *substantially simultaneously form the fins*; and (b) cooling the heated metal slurry to *form a contact area that provides a substantially continuous void free interface* between the core object and the fins when hardened for effective heat transfer across the contact area, as in claim 1. In fact, both Miki and Bradley appear to be silent with respect to such features. More particularly, neither one appears to disclose methods where a plurality of fins (or other components) are formed simultaneously, and where an interface between the fins and core object forms a continuous void free interface that allows for effective heat transfer.

What is more, the Applicants respectfully submit that this combination is impermissible because such a combination would render one or both of the references unsatisfactory for its intended purpose.

In the Office Action the Examiner appears to acknowledge that neither Miki nor Bradley discloses the formation of a substantially continuous void free interface between a core object and a metal slurry. Nonetheless, the Examiner states that the combination of Miki and Bradley "...is expected to form the fins substantially simultaneously and to have a substantially void free interface between the core and the metal slurry since the semi-solid slurry of Bradley is also injected into the mold cavity of Miki to unite the core perform".

The Examiner does not provide any evidence or support for such an "expectation". Nor is there any, other than the disclosure in the instant application which, as the Examiner knows well, cannot be used to reject the claims.

The Applicants believe that one skilled in the art would not have combined the teachings of Miki and Bradley, much less attempt to inject the semi-solid slurry of Bradley into the mold cavity of Miki to unite a core perform, because the thixotropic slurry of Bradley has a higher viscosity than the molten metal of Miki (*see, e.g.,* the paragraph bridging columns 13-14 of Bradley). It is this difference in viscosity which would have discouraged, not encouraged, one

skilled in the art to combine Miki and Bradley to create a substantially continuous void free interface, as set forth in the claims. Further, the combination of Bradley and Miki would require Miki to change its principle of operation in order to operate using the higher viscosity, thixotropic slurries of Bradley. Such a change is impermissible because it would render Miki unsatisfactory for its intended purpose of operating using molten metals.

Further, Miki provides insufficient motivation to use a thixotropic metal because the higher viscosity metal would have less flowability to form the contact area that provides the substantially continuous void free interface. As such, there is no predictable solution or common sense result of forming a substantially continuous void free interface by combining the teachings of these references as required by *KSR International Co. v. Teleflex, Inc.*, 82 USPQ2d 1385 (2007)(“KSR”).

The Examiner appears to take the position that, by presenting the arguments above the Applicants have misinterpreted *KSR*. The Applicants respectfully disagree and request that the Examiner explicitly withdraw the statement on page 4 of the Office Action that the previous arguments submitted by the Applicants “was not meritorious”.

*KSR* did not say that evidence related to a “motivation to combine” references (or a lack thereof) was irrelevant to the issue of obviousness as the

Examiner appears to imply. To the contrary, “identifying a teaching, suggestion, or motivation to combine can be useful tools in avoiding erroneous rejections” (see *Ex parte Armitage*, Appeal No. 2008-004803, page 7, decided September 4, 2009). For sure, KSR did hold that such evidence must not “deny factfinders recourse to common sense” *Id.*

The arguments set forth by the Applicants above in no way require the Examiner to ignore common sense. To the contrary, the arguments set forth above flow from Applicants present understanding of the methods in Miki and Bradley. Rather than require the Examiner to ignore common sense the arguments set forth above by the Applicants only serve to buttress the common sense of one of ordinary skill in the art.

It is axiomatic that to set forth a sufficient basis of obviousness the Examiner must substantively address all of the rationales set forth in Applicants’ previous response. The Examiner does not appear to have done so.

For example, in rebuttal to the Applicants’ position that one skilled in the art would not have combined the teachings of Miki and Bradley because the thixotropic slurry of Bradley has a higher viscosity than the molten metal of Miki, the Examiner appears to reply that “it is a known practice to inject semi-solid slurry into a casting die to unite to [sic] a perform object” (page 5). In sum

rather than address the substantive, specific shortfall of combining Miki and Bradley, this general statement appears to side step the issue.

One of the thrusts of the BPAI's decision in *Ex parte Armitage* is that when an Applicant sets forth specific arguments that clearly demonstrate the unsuitability of combining references it is insufficient for an Examiner to ignore these specific arguments and, instead, rely on broad, unsupported statements as to the knowledge of those skilled in the art. Accordingly, the Applicants respectfully request that the Examiner address the specific rationale set forth above, namely: in light of the fact that the thixotropic slurry of Bradley has a higher viscosity than the molten metal of Miki, what evidence does the Examiner have that one of ordinary skill would have proceeded to combine these two references to arrive at the claimed inventions?

Paraphrasing the BPAI in *Ex parte Armitage* (see page 10), the Applicants submit that "even an artisan possessing creativity and common sense, and having knowledge of" methods of injecting semi-solid slurries into a casting die would not have reasonably combined Miki and Harvey "in the manner suggested by the Examiner, but for having the benefit of the instant claims to impermissibly use as a guide." *Id.*

Accordingly, the Applicants respectfully request withdrawal of the rejections and allowance of claims 1-4, 6-8 and 19 and withdrawal of the

statement on page 4 of the Office Action that the previous argument submitted by the Applicants “was not meritorious”.

**(ii) claims 9-12, 14-16 and 20**

Claims 9-12, 14-16 and 20 were rejected under 35 U.S.C. §103(a) based on the combination of Miki, Bradley, and newly cited Japanese reference JP 6-292,944 (“944 reference”). Applicants respectfully disagree and traverse these rejections for at least the following reasons.

Initially, the Applicants note that the Examiner does not articulate how Miki and Bradley are being applied to the claims (i.e., what features are purportedly disclosed by Miki? by Bradley?). This is insufficient. Accordingly, the Applicants request that the Examiner clarify the rejections in the next Office Action.

The sum and substance of the stated rejections focus on the ‘944 reference. The Examiner states that the ‘944 reference “show to continuous cast articles by using a continuous casting machine, which consists of two series of die plates, such that to speed up the casting process”. This rationale is essentially the same one set forth by the Examiner in a previous Office Action, though now relied on to support the addition of the ‘944 reference.

Presumably the Examiner's rationales for applying Miki and Bradley are the same as in claims 1-4, 6-8 and 19. Accordingly, similar to the rationales set forth above, neither Miki nor Bradley, taken separately or in combination, discloses the features of: (a) injecting a heated metal slurry into full mold cavities under a predetermined pressure to *substantially simultaneously form fins*; and (b) cooling the heated metal slurry to *form a contact area that provides a substantially continuous void free interface* between a core object and the fins when hardened for effective heat transfer across the contact area, as in claim 9.

In addition, the combination of Miki and Bradley is impermissible as discussed above. The '944 reference does not make up for these deficiencies.

Yet further, the Applicants note that because the '944 Reference is in the Japanese language it is not possible for the Applicants to determine at this time whether the combination of the '944 reference, Miki and Bradley is permissible. That is, whether such a combination of references would render one or more of the references unsatisfactory for its intended purpose. More specifically, while the Applicants thank the Examiner for providing an English translation of the Abstract of the '944 reference, the Abstract does not provide enough detail.

For example, the translated Abstract does not discuss pressures or temperatures. Thus, the Applicants cannot yet determine whether the pressures or temperatures discussed in the '944 reference are suitable to be used at the pressures and temperatures disclosed in Miki and Bradley without destroying the structural integrity of the apparatus discussed in the '944 reference.

The Applicants respectfully request a full translation of the '944 reference in the next Office Action.

In conclusion, the Applicants request withdrawal of the rejections and allowance of claims 9-12, 14-16 and 20.

In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact John E. Curtin at 703-266-3330 to discuss this application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 50-3777 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

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